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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DAVID A. HAGAR, PAUL A. JAKUBIK,
and STEPHEN S. JERNIGAN

Appeal 2016-007249
Application 12/263,169
Technology Center 2100

Before ALLEN R. MacDONALD, JOHN R. KENNY, and
MICHAEL J. ENGLE, *Administrative Patent Judges*.

MacDONALD, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from a rejection of claims 1–6, 8–27, and 29–43. Final Act. 1. We have jurisdiction under 35 U.S.C. § 6(b).

Exemplary Claim

Exemplary claims 1–3 under appeal read as follows (emphasis added and multilevel numbering added (as used in the Final Action at page 3)):

> 1. A computerized method of determining latent relationships in data comprising:
>
> [a.] receiving a first matrix comprising a first plurality of terms, the first matrix representing one or more data objects to be queried;
>
> [b.] partitioning, before any Singular Value Decomposition processing, the first matrix into a plurality of subset matrices by:
>
> [i.] clustering similar vectors from the first matrix together;
>
> [ii.] creating a binary tree of clusters based on the clustering of the similar vectors; and
>
> [iii.] creating the plurality of subset matrices using the created binary tree of clusters; and
>
> [c.] processing each subset matrix with a natural language analysis process to create a plurality of decomposed matrices comprising:
>
> [i.] a plurality of T_0 matrices that provide a mapping of the first plurality of terms into a first dimensional space;
>
> [ii.] a plurality of S_0 matrices that provide a scaling for the plurality of T_0 matrices; and
>
> [iii.] a plurality of D_0 matrices that provide a mapping of a plurality of documents into a second dimensional space;
>
> [d.] determining a similarity between each of the plurality of T_0 matrices and a query from a user;

[e.] ***selecting***, based on the determined similarities between each of the plurality of T_0 matrices and the query from the user, ***a particular one of the plurality of T_0 matrices that has the greatest similarity to the query***; and

[f.] generating a plurality of result terms using the selected T_0 matrix and the query.

2. The computerized method of determining latent relationships in data of Claim 1, wherein partitioning the first matrix into a plurality of subset matrices comprises:

forming each of the subset matrices ***so that each vector in the first matrix appears in exactly one subset matrix***, the size of each subset matrix being a size that may be usefully processed by the natural language analysis process

3. The computerized method of determining latent relationships in data of Claim 1, wherein vectors ***are not discarded*** from the first matrix ***prior to partitioning*** the first matrix into a plurality of subset matrices.

Rejections

The Examiner rejected claims 1–6, 8, 9, 11–20, 22–27, 29, 30, 32–41, and 43 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Behrens et al. (US 7,152,065 B2; iss. Dec. 19, 2006) and Sasaki et al., *Web Document Clustering Using Threshold Selection Partitioning*, Proceedings of NTCIR-4 (2004).[1]

[1] Separate patentability is not argued for claims 4–6, 8, 9, 11–20, 22–27, 29, 30, 32–41, and 43. Except for our ultimate decision, these claims are not discussed further herein.

The Examiner rejected claims 10, 21, 31, and 42 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Behrens, Sasaki, and Roitblat et al. (US 2008/0059512 A1; pub. Mar. 6, 2008).[2]

Appellants' Contentions

1.A. Appellants contend that the Examiner erred in rejecting claim 1 under 35 U.S.C. § 103(a) because:

> While the cited portions of *Behrens* may disclose selecting **sub-collections**, they do not disclose "***selecting . . . a particular one of the plurality of T_0 matrices,***" and especially not selecting one of the plurality of T_0 matrices "***that has the greatest similarity to the query***," as recited in Claim 1.

App. Br. 11.

> That is, while the cited portion of *Behrens* may disclose selecting the best **sub-collections** based on rank, merely **selecting sub-collections** does not disclose, teach, or suggest "***selecting . . . a particular one of the plurality of T_0 matrices that has the greatest similarity to the query***," as recited in Claim 1.

App. Br. 12.

> Furthermore, the Examiner's mapping of Claim 1 to *Behrens* is flawed. For example, the Examiner maps *Behrens*' "sub-collections" to the claimed "subset matrices" (Final Office Action, page 3, footnote 2, page 14, paragraph 47, and page 15, paragraph 49) and then alleges that *Behrens* "discloses decomposition of the sub-collections (i.e., subset matrices) into the plurality of T_0, S_0, and D_0 matrices." (Final Office Action, page 14, paragraph 47.) The Examiner then collapses the distinction between the claimed "subset matrices" and the claimed "decomposed matrices comprising . . . a plurality of T_0

[2] Separate patentability is not argued for claims 10, 21, 31, and 42. Thus, the rejections of these claims turns on our decision as to claim 1. Except for our ultimate decision, these claims are not discussed further herein.

> matrices" by alleging that *Behrens* teaches that "a highest ranked sub-collection (i.e., subset matrix that has a T_0 with the greatest similarity to the query) is selected." (Final Office Action, page 15, paragraph 49.) However, selecting a sub-collection (equated to the claimed "subset matrices" by the Examiner) does not disclose selecting "a particular one of the plurality of T_0 matrices," as required by the above portion of Claim 1.

App. Br. 12 (emphasis omitted).

1.B. Appellants contend that the Examiner erred in rejecting claim 1 under 35 U.S.C. § 103(a) because:

> [T]he Examiner states in the Answer that the claimed "T_0 matrix" is created using SVD (Examiner's Answer, Pages 3-4), but the cited portions of *Behrens* for the disputed portion of Claim 1 (which require the claimed "T_0 matrix") are completely devoid of any mention whatsoever of SVD.

Reply Br. 3 (footnote omitted).

> Furthermore, other portions of *Behrens* specifically disclose that the "term sets" of *Behrens* simply contain terms that correspond to using k-means clustering, not SVD . . . . That is, *Behrens* specifically defines the "term set" as simply being terms that are the result of using k-means clustering, not SVD.

Reply Br. 6 (citing Behrens 5:62–6:5).

1.C. Appellants also contend that the Examiner erred in rejecting claim 1 under 35 U.S.C. § 103(a) because:

> [T]he Examiner provides no proof or explanation of how *Behrens*' "term set" is a "T_0 matrix" that was created by processing a "***subset matrix with a natural language analysis process***" and that "***provide[s] a mapping of the first plurality of terms into a first dimensional space***," as required by other portions of Claim 1.

Reply Br. 3.

2. Appellants also contend that the Examiner erred in rejecting claim 2 under 35 U.S.C. § 103(a) because:

> The Examiner relies on 5:4-31 of *Behrens* as allegedly teaching this portion of Claim 2. (Final Office Action, page 5.) However, this is incorrect. While the cited portions of *Behrens* may disclose partitioning a collection of data objects into sub-collections, they do not disclose "forming each of the subset matrices so that each vector in the first matrix appears in exactly one subset matrix," as recited in Claim 2.

App. Br. 13 (emphasis omitted).

> In the Examiner's Answer on Pages 5-7, the Examiner points to new portions of both Behrens and Sasaki for this portion of Claim 2 . . . . Here, the ***Examiner jumps to the erroneous conclusions*** that Behrens' alleged disclosure of using clustering to create homogenous sub-collections and Sasaki's alleged disclosure of disjoint clusters ***necessarily discloses*** "forming each of the subset matrices so that each vector in the first matrix appears in exactly one subset matrix," as required by Claim 2. However, ***this apparent reliance on inherency is incorrect***.

Reply Br. 8 (Appellants' emphasis omitted, Panel emphasis added).

3. Appellants also contend that the Examiner erred in rejecting claim 3 under 35 U.S.C. § 103(a) because:

> [T]he proposed *Behrens-Sasaki* combination fails to disclose, teach, or suggest "wherein vectors are not discarded from the first matrix prior to partitioning the first matrix into a plurality of subset matrices," as recited in Claim 3. The Examiner relies on 4:59-67 and 5:1-3 of *Behrens* as allegedly teaching this portion of Claim 3. (Final Office Action, page 5.) Specifically, the Examiner states the following:
>
> > Preprocessing removes and ignores words (i.e., discards vectors) from the documents in the collection (i.e., first matrix). The preprocessing step is optional, which is interpreted to mean that the invention can also work without preprocessing (i.e., vectors are not discarded).

> (*Id.* at footnote 4.) However, this is incorrect. While the cited portions of *Behrens* may disclose a preprocessing step where **words** may be ignored, they do not disclose "wherein **vectors** ***are not discarded from the first matrix prior to partitioning*** the first matrix into a plurality of subset matrices," as recited in Claim 3.

App. Br. 14–15 (bold-italicized emphasis added).

> Furthermore, the Examiner's footnote above suggesting that the cited portion of *Behrens* discloses Claim 3 because it is an optional step is flawed at least because other portions of *Behrens* explicitly disclose that it **is** necessary to remove stop words for the *Behrens* invention . . . . (*Behrens*, 6:25-35 . . .) That is, *Behrens* explicitly states that "it is necessary to exclude high frequency terms." *Id.* Thus, the Examiner's assertion that removing terms from the *Behrens* invention is optional and therefore "can also work without preprocessing" is incorrect.

App. Br. 15.

Issues on Appeal

Did the Examiner err in rejecting claims 1–3 as being obvious?

ANALYSIS

We have reviewed the Examiner's rejections in light of Appellants' Appeal Brief and Reply Brief arguments. We disagree with Appellants' conclusions that the Examiner has erred. Rather, we concur with the conclusions ultimately reached by the Examiner.

As to Appellants' above contention 1.A, Appellants appear to be construing "selecting . . . a particular one of the plurality of T_0 matrices that has the greatest similarity to the query" to require that the result of the selection must be limited to exactly the matrix having the greatest similarity to the query and cannot be a larger sub-collection containing a T_0 matrix.

However, this argument does not adequately address the Examiner's finding that Behrens "determines the closest (i.e., greatest similarity) term set (i.e., T_0 matrix) to the query vector" and "[t]he selected term set (i.e., T_0 matrix) is used to determine which sub-collection of documents to query." Ans. 4. Thus, even though each sub-collection may contain a T_0 matrix, it is the T_0 matrix itself that is selected as having the greatest similarity. Ans. 4–5. We, therefore, agree with the Examiner (Final Act. 4, 15) that Behrens suggests this limitation, including at column 9, lines 2–33.

Further, we construe the limitation "selecting . . . a particular one of the plurality of T_0 matrices that has the greatest similarity to the query" to only require that the result of the selecting includes the matrix having the greatest similarity. Claim 1 is an open-ended "comprising" claim that does not preclude other unclaimed steps also selecting other less similar matrices (e.g., the matrix with the second greatest similarity) so long as the greatest similarity matrix is selected. *David Netzer Consulting Eng'r LLC v. Shell Oil Co.*, 824 F.3d 989, 998 (Fed. Cir. 2016) ("[A] method claim with the word 'comprising' appearing at the beginning generally allows for additional, unclaimed steps in the accused process, but each claimed step must nevertheless be performed as written.").

As to Appellants' above contention 1.B, we disagree. Contrary to Appellants argument that "*Behrens* specifically defines the 'term set' as simply being terms that are the result of using k-means clustering, not SVD" (Reply Br. 6, citing Behrens 5:62–6:5), Behrens states that k-means clustering is performed (step 120) prior to step 130, which is the Singular Value Decomposition (SVD), and again at step 140 on the reduced vector

spaces of the SVD to ultimately get the term set at step 160 (Behrens 5:4–66). Thus, the term set is a result of the SVD.

As to Appellants' above contention 1.C, Appellants present in the Reply Brief a new argument against the rejection of claim 1. Previously, Appellants presented a different argument in the original Appeal Brief (App. Br. 10–12), to which the Examiner responded (Ans. 3–5). In the Reply Brief, however, Appellants further argue the "subset matrix with a natural language analysis process" and "provide a mapping of the first plurality of terms into a first dimensional space" limitations of claim 1. These limitations were not previously argued in the Appeal Brief or raised by the Examiner in the Answer. In the absence of a showing of good cause by Appellants, we decline to consider an argument raised for the first time in the Reply Brief, as the Examiner has not been provided a chance to respond. *See* 37 C.F.R. § 41.41(b)(2) (2012); *In re Hyatt*, 211 F.3d 1367, 1373 (Fed. Cir. 2000) (noting that an argument not first raised in the brief to the Board is waived on appeal); *Ex parte Nakashima*, 93 USPQ2d 1834, 1837 (BPAI 2010) (informative) (explaining that arguments and evidence not timely presented in the principal brief will not be considered when filed in a reply brief, absent a showing of good cause explaining why the argument could not have been presented in the principal brief); *Ex parte Borden*, 93 USPQ2d 1473, 1477 (BPAI 2010) (informative) ("Properly interpreted, the Rules do not require the Board to take up a belated argument that has not been addressed by the Examiner, absent a showing of good cause."). Appellants have provided no showing of good cause.

As to Appellants' above contention 2, we disagree. Although we agree with Appellants' argument (App. Br. 13) that Behrens fails to disclose,

teach, or suggest each vector in the first matrix appears in exactly one subset matrix, the Examiner correctly responds (Ans. 6) that Sasaki discloses partitioning an original cluster into disjointed[3] clusters. Appellants then further argue "this apparent reliance on inherency is incorrect." Reply Br. 8. However, we see no relevance to this further argument as we find no reliance on inherency by the Examiner.

As to Appellants' above contention 3, we agree with Appellants' argument (App. Br. 14) that Behrens at column 4, lines 59–67 and column 5, lines 1–3 fails to disclose, teach, or suggest "wherein vectors are not discarded from the first matrix prior to partitioning the first matrix into a plurality of subset matrices." However, we disagree with Appellants with respect to Behrens at column 6, lines 25–35. Claim 3 only requires not discarding prior to partitioning. The discarding step discussed at Behrens column 6, lines 34–35 is an alternative to discarding during preprocessing and is performed at the time the similarity is measured which is subsequent to (i.e., not prior to) the partitioning step. The Examiner correctly points this out. Ans. 8:3–11. Appellants do not further dispute this issue in the Reply Brief.

[3] In mathematics, the term "disjoint" means "(of two sets) having no members in common; having an intersection that is empty." E.J. Borowski & Jonathan M. Borwein, *HarperCollins Dictionary of Mathematics* 169 (1991).

CONCLUSIONS

(1) The Examiner has not erred in rejecting claims 1–6, 8–27, and 29–43 as being unpatentable under 35 U.S.C. § 103(a).

(2) Claims 1–6, 8–27, and 29–43 are not patentable.

DECISION

The Examiner's rejections of claims 1–6, 8–27, and 29–43 are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED